AQX Controller

User's Guide

MARTIN AUDIO
LONDON

The Martin Experience

All material © 2007. Martin Audio Ltd. Subject to change without notice.

CONTENTS (ENGLISH)

		Page No
1	APPROVALS	2
2	WARNINGS	2
3	SAFETY INSTRUCTIONS	3
4	INTRODUCTION	4
5	UNPACKING	4
6	INSTALLATION	4
7	MAINS CONNECTIONS	4
8	SIGNAL CONNECTIONS	5
8.1	INPUT CONNECTIONS	5
8.2	OUTPUT CONNECTIONS	5
9	MOTHERBOARD SETTINGS	6
10	PLUG IN CARD SETTINGS	7
11	SYSTEM CONFIGURATIONS	8
11.1	AQ5 FULL RANGE	8
11.2	AQ5 WITH AQ215 SUB BASS	8
11.3	AQ6 WITH AQ210 SUB BASS	9
11.4	AQ8 WITH AQ210 SUB BASS	9
11.5	AQ12 WITH AQ212 SUB BASS	10
11.6 A	Q15 WITH AQ215 SUB BASS	10
12	LEVELS	11
13	LIMITERS	11
14	AMPLIFICATION	13
15	WARRANTY	13
16	TECHNICAL SPECIFICATION	15

MARTIN AUDIO
LONDON

The Martin Experience

All material © 2007. Martin Audio Ltd. Subject to change without notice.

1 APPROVALS

This equipment conforms to the requirements of the EMC directive 89/336/EEC, amended by 92/31/EEC and 93/68/EEC and the requirements of the Low Voltage Directive 73/23/EEC, amended by 93/68/EEC.

Standards Applied	EMC Emission	EN55103-1: 1996
	EMC Immunity	EN55103-2: 1996.
	Electrical Safety	EN60065: 1998.

2 WARNINGS

Explanation of graphical symbols

The lightning symbol within a triangle is intended to alert the user to the presence of lethal voltages within the unit that are of sufficient magnitude to constitute a risk of electric shock to humans.

The exclamation mark within a triangle is intended to alert the user to the presence of important operating and service instructions in the literature accompanying the product.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

3 SAFETY INSTRUCTIONS

Before using your AQX controller, please read the operating instructions and the safety suggestions.

Keep this manual for future reference.

Do not operate the controller if liquid ingress is suspected.

Do not stand water or any other liquid on, or near the controller.

Do not use this controller near water. Do not operate the controller if wet or standing in liquid.

Clean only with a dry cloth.

Always install the unit in accordance with the instructions.

Do not operate the controller on or near any source of heat, such as radiators, lighting dimmer racks, or other apparatus that produce heat.

Always operate the unit with the chassis ground wire connected to the electrical safety earth. Do not tamper with the electrical safety earth, it is provided for your safety. A grounding type plug is fitted; this has two pins and a third grounding prong. If the plug provided does not fit your mains outlet, consult an electrician or a competent person to replace the fitted plug.
Connect only to AC power outlets rated 230 - 240V (or 100 - 120 V), 50-60Hz.

Do not use this controller if the mains cable is damaged or frayed, particularly check where the mains cable exits the controller and the mains plug. Protect the mains cable from being walked upon or rolled over by heavy objects.

Only use accessories specified by the manufacturer.

The unit is intended for use in a 19" rack. Follow the mounting instructions.

Refer all servicing to qualified personnel only. Servicing is required when the apparatus has been damaged in any way such as:
Mains cable, or plug is damaged.
Liquid has entered the controller.
An object has fallen into the unit.
The controller has been exposed to rain or moisture.
The controller does not operate normally.
The controller was dropped or the enclosure is damaged.

An experienced person should always supervise inexperienced adults or minors when using professional audio equipment.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

4 INTRODUCTION

Thank you for purchasing a Martin Audio AQX controller. The AQX controller is used to optimise the performance of the AQ series of loudspeakers in all modes of operation. A universal plug-in card is fitted which provides crossover filtering and EQ settings for all combinations of AQ series loudspeakers.

5 UNPACKING

Each Martin Audio AQX controller is built and tested to the highest standards and thoroughly inspected before it leaves the factory. After unpacking the unit, please examine it carefully for any signs of transit damage and inform your dealer if any such damage is found. It is suggested that you retain the original packaging so that the unit can be repacked at a future date if necessary.

Please note that Martin Audio and its distributors cannot accept responsibility for damage to any returned product through the use of none-approved packaging.

6 INSTALLATION

The AQX requires a vertical rack space of 1U (1.75"/44 mm). As with any low level signal processing equipment it is recommended that it is sighted well away from any high level sources of electromagnetic radiation, and should not for example be placed directly above power amplifiers or lighting dimmers, which could induce residual noise into the system.

7 MAINS CONNECTIONS

The AQX is supplied as standard with a captive mains lead with an integral U.K. 3 pin plug.
Should the moulded plug be removed and another plug substituted the cable must be re-wired as below.

GREEN/YELLOW	-	EARTH
BROWN	-	LIVE (+)
BLUE	-	NEUTRAL (-)

All material © 2007. Martin Audio Ltd. Subject to change without notice.

<u>WARNING:</u> The AQX Controller must always be operated with the mains safety earth connected.
The AQX is supplied from the factory in either 100/120V or 200/240V versions
Mains voltage tolerance ± 10% on each setting.

Fuse: - type 'T' semi-delay 160mA (L) 100-120V
Fuse: - type 'T' semi-delay 160mA (L) 220-240V.

NO ATTEMPT SHOULD BE MADE BY THE USER TO CHANGE THE MAINS OPERATING VOLTAGE FROM THAT SUPPLIED, REFER TO QUALIFIED PERSONNEL ONLY.

This equipment must be earthed.

8 SIGNAL CONNECTIONS

8.1 Input connections.

AQX inputs are on female XLR type connectors and are electronically balanced. Pin 1 is normally open circuit but may be linked to Ground (chassis earth) or Lift (sig.0v) by positioning jumper links on the main PCB (**J1.J2**).

The signal is always applied between pin **2** (hot +) and pin **3** (cold -).

Always use 2-core plus screen 'balanced' type signal cable, even for unbalanced circuits. The screen should be regarded as separate from the signal return, even if they are connected together at one end of the cable. Cable lengths longer than 3 meters should be avoided for unbalanced connections.

For either balanced or unbalanced operation, always connect the input signal between Pins 2 and 3. The input cable screen should be derived from the equipment which is sourcing the input provided that normal safety requirements are met (i.e. the mains earth is connected correctly).

8.2 Output connections.

AQX outputs are electronically balanced auto compensating via male XLR type connectors. Pin **1** can be configured to be open circuit or lifted (signal 0v). The output signal appears between Pins **2** and **3**.

Always use 2-core plus screen 'balanced' type signal cables, even for unbalanced circuits. The cable screen should be regarded as separate from the signal return, even if they are connected together at one end. This is to keep the screen a true screen so that signal return currents do not flow through it, which can induce signals in adjacent cables.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

For unbalanced use, whichever pin you have designated to be hot (+) connect the corresponding cold pin (-) and pin 1 together. The internal output signal ground J3, J4, J5, and J6 should be placed in the open circuit position which allows the amplifier to be locally grounded (as required for safety reasons) without causing a hum loop. If the signal is taken between Pin **2** or **3** and pin **1** a level loss and signal degradation will occur.

For balanced operation, the screen should be connected at the amplifier end to eliminate hum current loops, jumpers **J3, J4, J5**, and **J6** can be placed in the open circuit position. When using unbalanced connections avoid cable lengths greater than 3 meters.

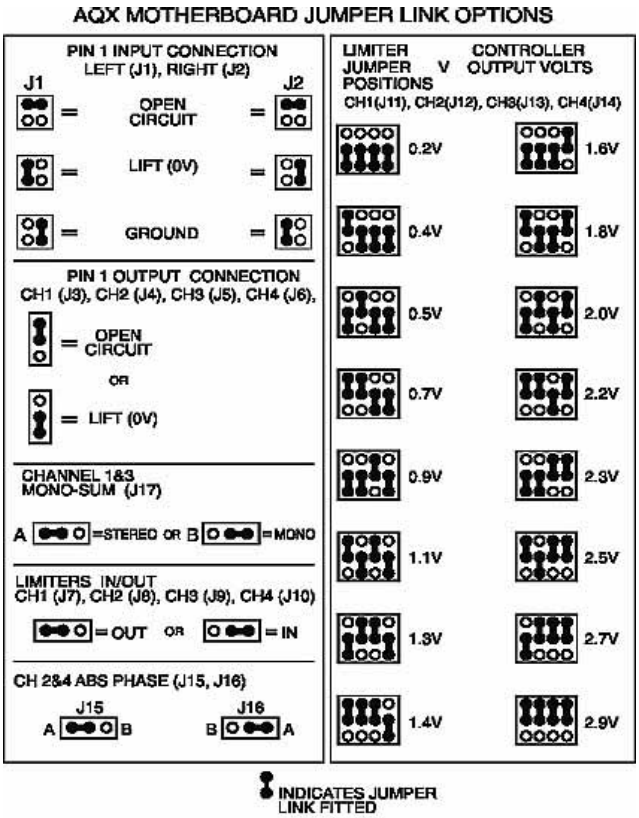
The power ratings of amplifiers connected to the AQX controller should lie within the range recommended for the AQ series of loudspeakers being used. Please refer to the section on amplification for further information.

9 MOTHERBOARD SETTINGS

AQX system controllers are supplied set up as follows:

Mains Voltage	-	220/240 Volts
Pin 1 (input) **J1, J2**	-	Open Circuit
Pin 1 (outputs **J3, J4, J5, J6.**	-	Lift (0V)
Mono Sum CH1/3 **J17**	-	Disabled Position ‘A’
Limiters in/out **J7, J8, J9, J10.**	-	IN
ABS Phase **J15, J16**	-	Position ‘A’
Limiter threshold	-	1.1 VOLTS
Mode switch (Front panel)	-	Blue LED ‘ON’ (With Sub)

All material © 2007. Martin Audio Ltd. Subject to change without notice.



Depending on the AQ cabinets being used and in which configuration, the mode switch on the front panel will have to be changed from the ‘With Sub’ position (Blue LED ‘ON’) to the ‘Full Range’ position (Amber LED ‘ON’). In the ‘With Sub’ mode channels 2 and 4 are switched to be high pass outputs, with channels 1 and 3 active
in a low pass configuration. When in "Full Range" mode the outputs from channels 1 and 3 are muted and outputs 2 and 4 are configured to be full range outputs. Please refer to the following section for card set up information.

10 PLUG IN CARD SETTINGS

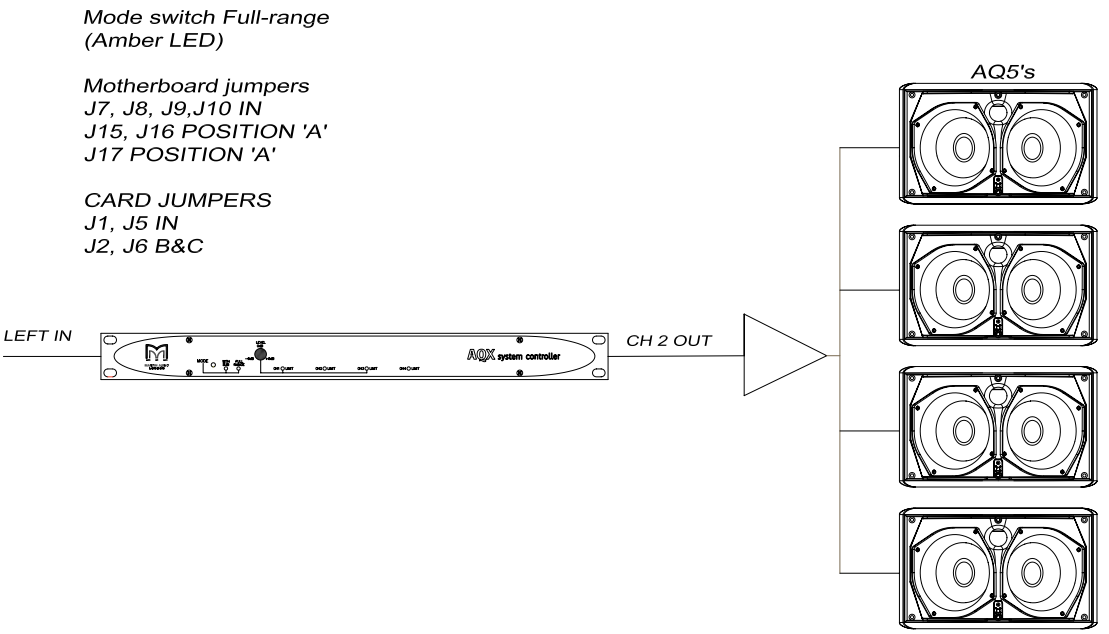
JUMPERS	J1/J5	J2/J6		J3/J7	J4/J8
AQ5	IN*	B&C	AQ112, 210, 212	A	A
AQ6, 8,10	IN*	A&D**	AQ215	B	A
AQ12, 15	OUT	A&D**	AQ112, 210, 212, with AQ5	A	B
*WHEN IN ‘WITH SUB’ MODE FITJUMPER IN ‘OUT’ POSITION. **FIT JUMPER IN ‘C’ IF HF BOOST IS REQUIRED.			AQ215 with AQ5	B	B

All material © 2007. Martin Audio Ltd. Subject to change without notice.

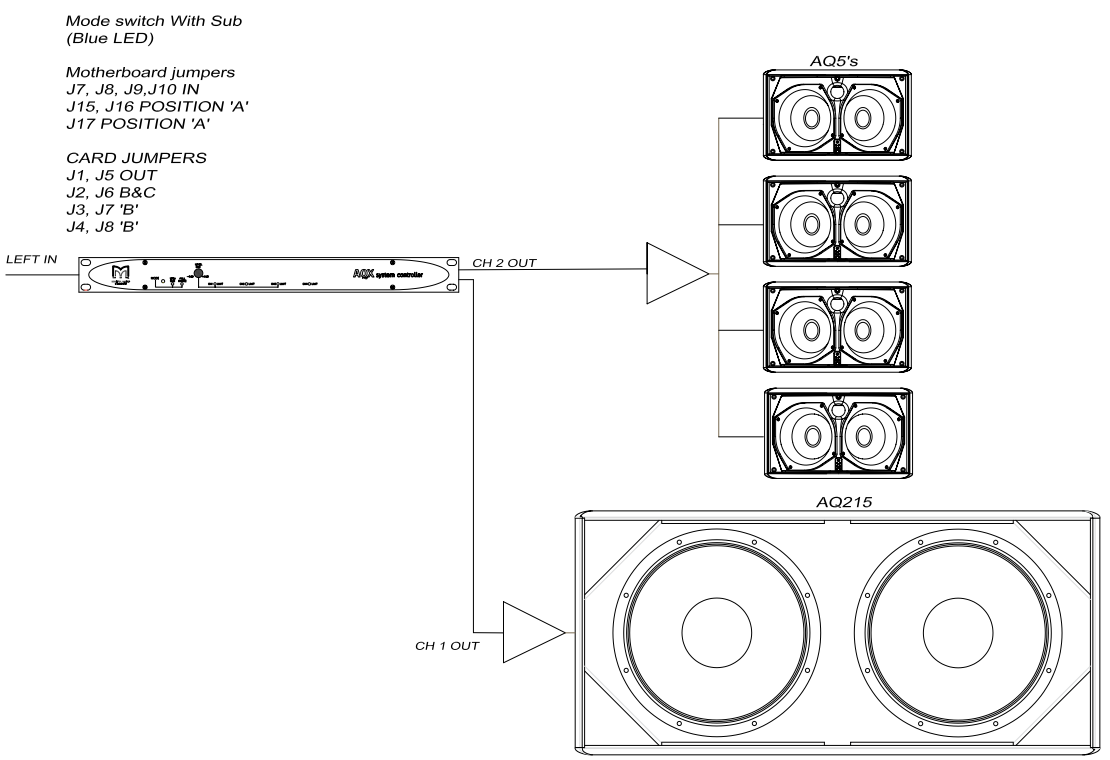
11 SYSTEM CONFIGURATIONS

There are many different system combinations possible with the AQ series. Shown below are some typical configurations. Please note for simplicity only one channel is shown.

11.1 AQ5 Full range (switched to 16 ohms). Four cabinets connected in parallel presenting a nominal 4 ohm load to the amplifier.

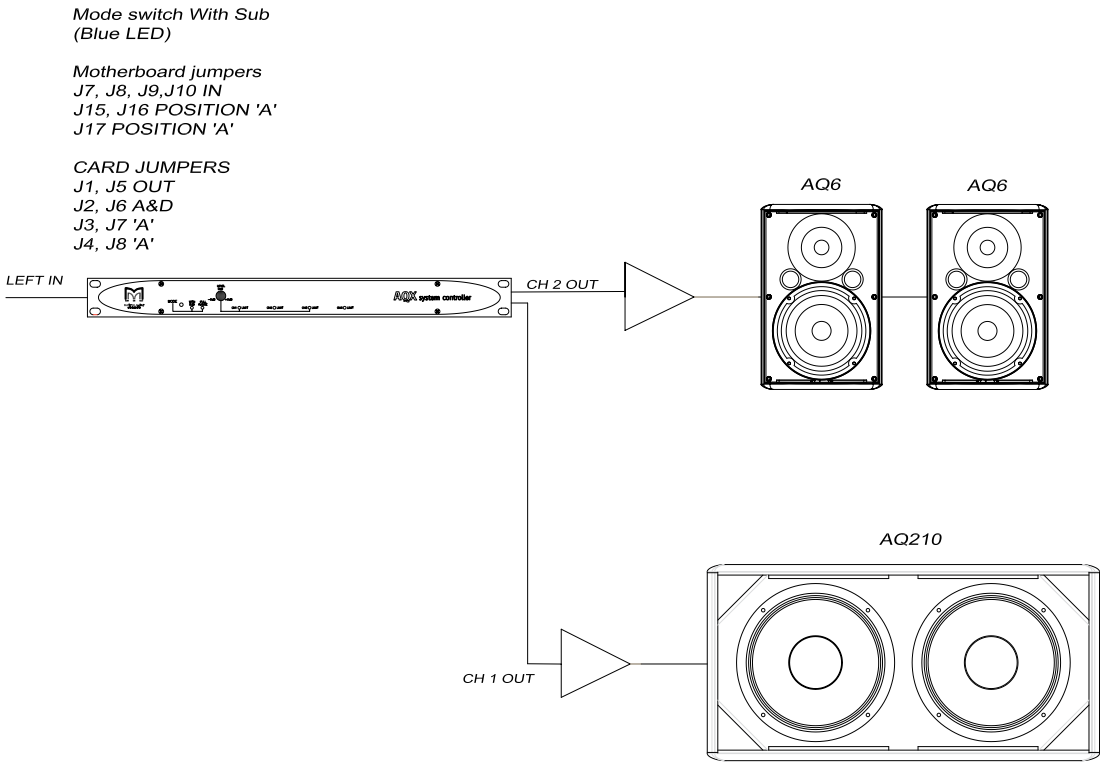


11. 2 AQ5 High pass (switched to 16 Ohms) with AQ215 sub bass.

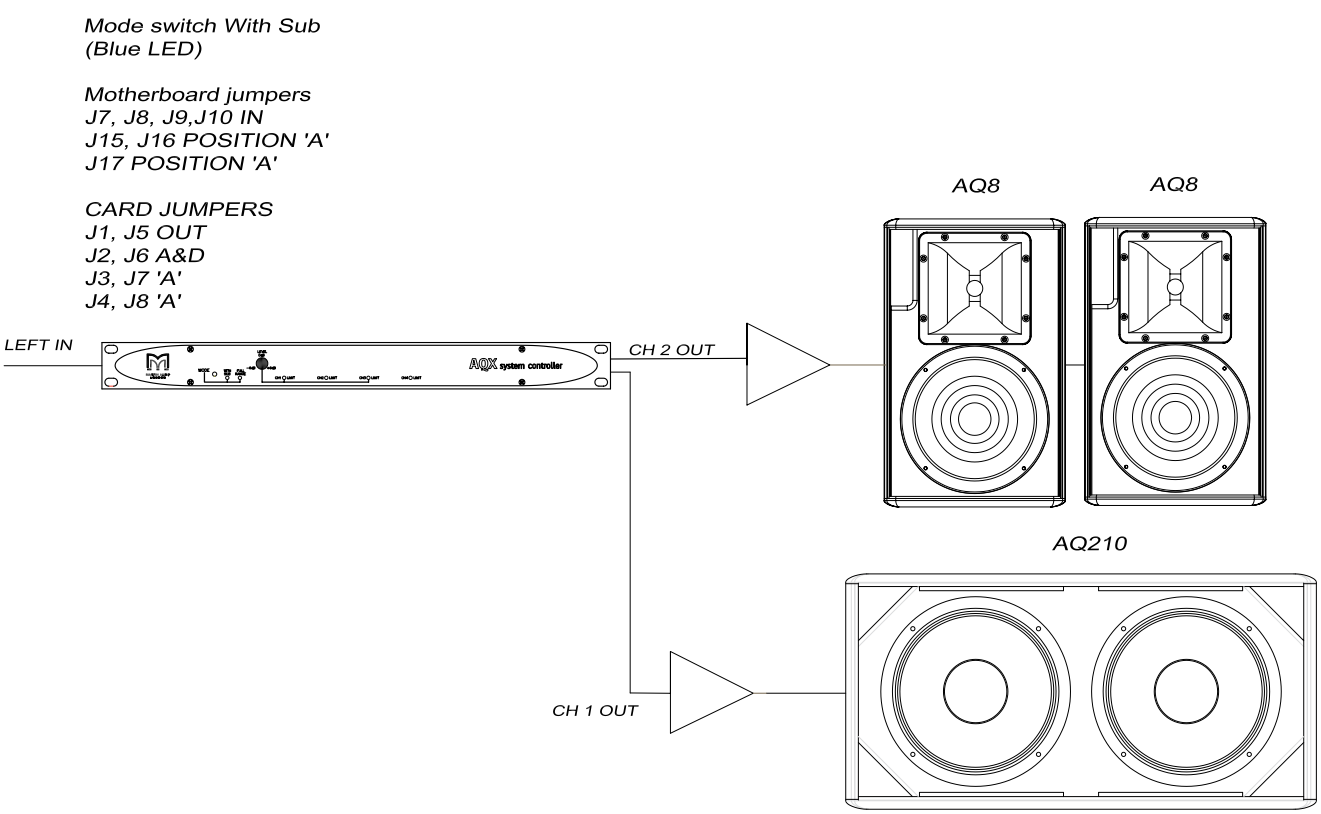


All material © 2007. Martin Audio Ltd. Subject to change without notice.

11.3 AQ6 High pass with AQ210 Sub bass.

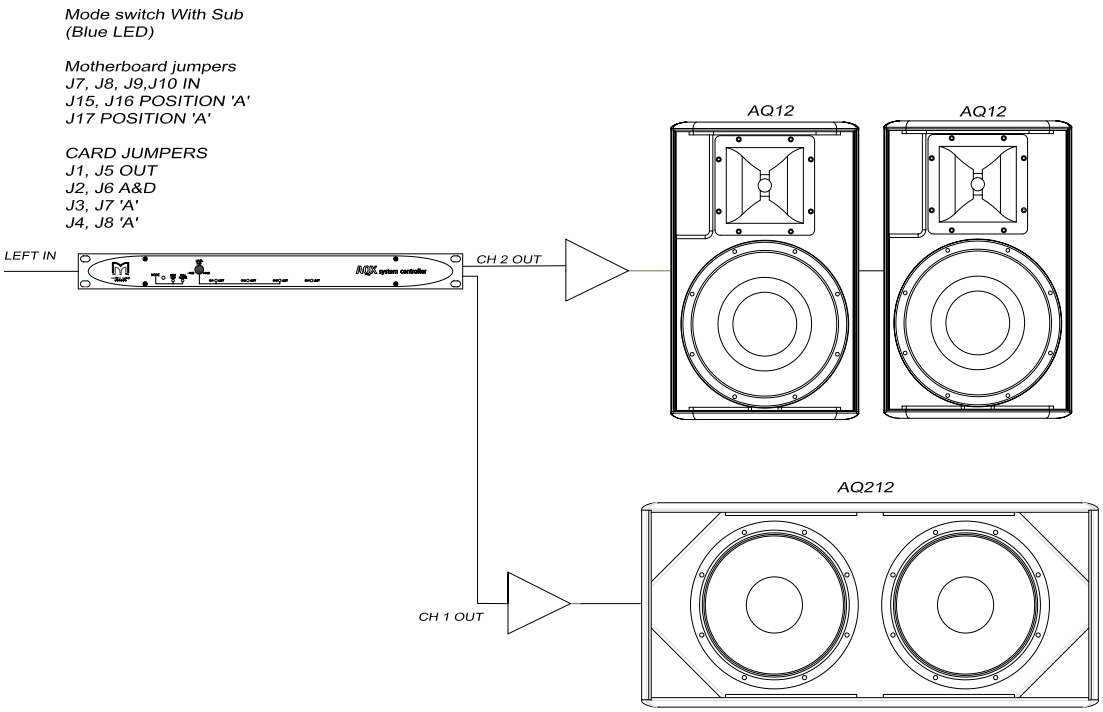


11.4 AQ8 High pass with AQ210 Sub bass.

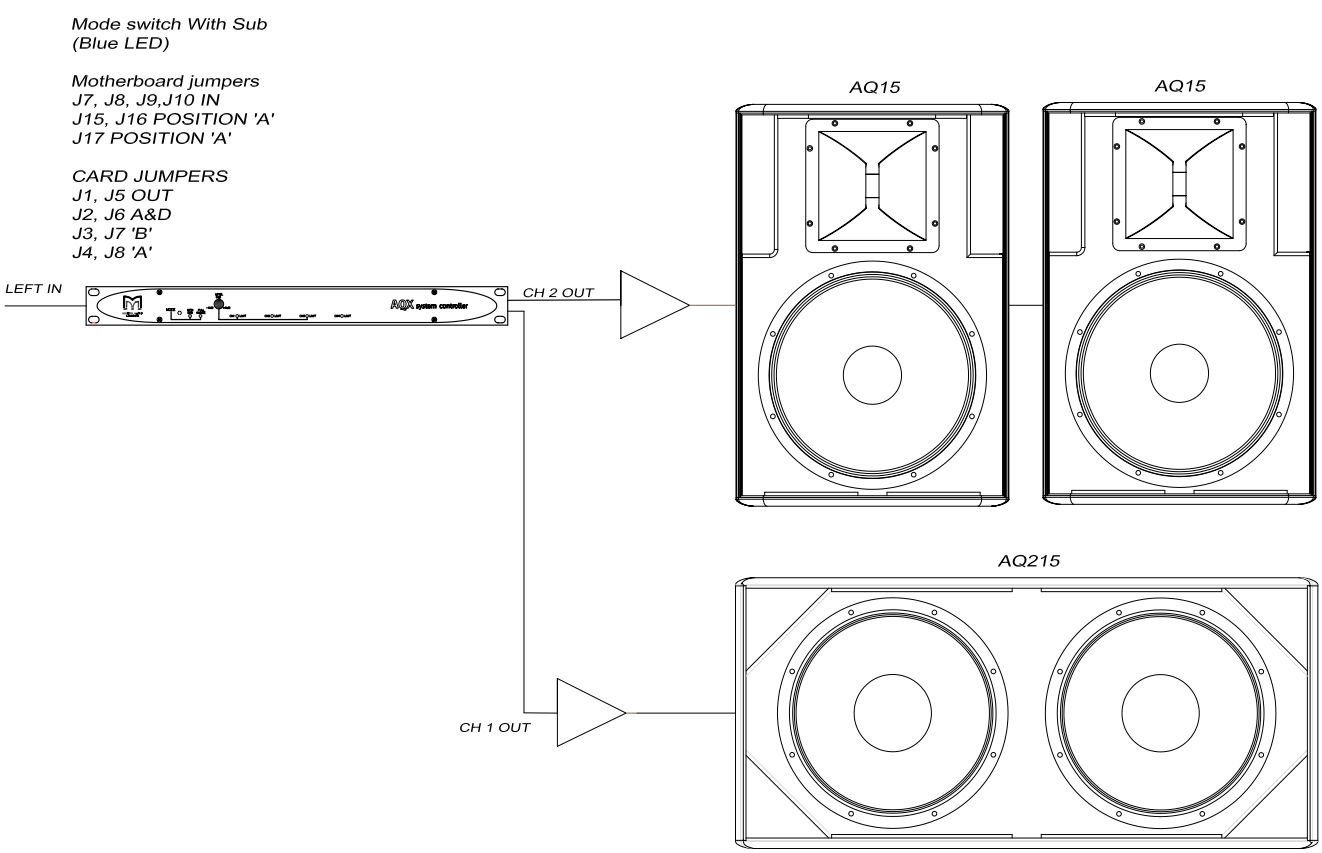


All material © 2007. Martin Audio Ltd. Subject to change without notice.

11.5 AQ12 High pass with AQ212 Sub bass.



11.6 AQ15 High pass with AQ215 sub bass.



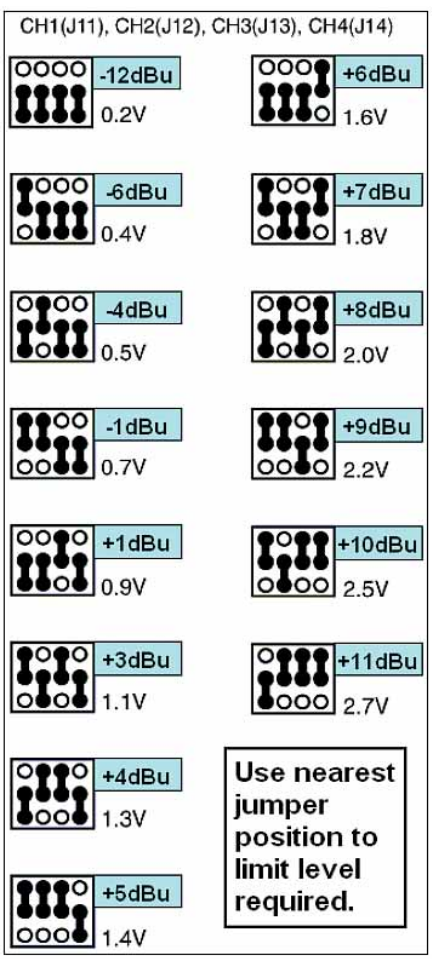
All material © 2007. Martin Audio Ltd. Subject to change without notice.

12 LEVELS

The plug-in card provides the necessary filtering, EQ, channel gain or attenuation to provide approximate system balance when the level control is in the 0dB position, (assuming the use of amplifiers with identical gains). The level control can provide 6dB's of gain or attenuation on channels 2 and 4, to adjust the balance of the system when using different ratios of sub bass cabinets to top boxes.

Please note the AQX controller will always be shipped with the level control set in the 0dB position. The screwdriver 'slot' in the end of the spindle is un-calibrated and does not correspond to any particular level.

13 LIMITERS



Each AQX output has an associated limiter, which provides momentary gain reduction when the output signal level exceeds a pre-set threshold value. A red LED indicates the onset of limiting. Threshold settings for the limiters may be adjusted by first disconnecting the power to the AQX, then removing the top cover (two screws on each side). The plug-in card must then be un-clipped from the four locating pillars and swung up on it's ribbon cable to reveal the four banks of selector pins **J11, J12 J13**, and **J14**. Threshold values corresponding to the jumper link positions are printed on the lid of the controller and duplicated below.

Each output channel limiter sets a maximum voltage level from the AQX, which in turn sets the maximum continuous voltage that the amplifier can present to the loudspeaker.

The limiters in the AQX may be used to control the average continuous power applied to the loudspeakers, if power amplifiers with a higher maximum power rating than that recommended are used. (See Amplifier section). Alternatively, if the loudspeakers selected will handle the full rated power, or if maximum system headroom is required, the limiters may be set to prevent the amplifiers being driven into hard clipping.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

WARNING: Care should be taken to avoid amplifier clipping. It is important to understand that a low power amplifier driven into clipping is more likely to damage a loudspeaker than a higher power amplifier used within its ratings. This is because music signals have a high peak to average "crest" factor. When an amplifier is severely overdriven, its output waveform is clipped (its peaks are squared off) – reducing the crest factor. In extreme cases, the waveform can approach that of a square wave. An amplifier is normally capable of producing far more power under these conditions than its normal undistorted rated power output. Correct setting of the limiters will automatically avoid amplifier clipping and prevent damage occurring to the loudspeakers.

Each limiter may be completely defeated by setting **J7, J8, J9** and **J10** to the out position. **WARNING This should only be done in special circumstances** where another controller or compressor limiter is to be driven from any of the output channels of the AQX. The limiters should then be defeated on those channels to prevent them operating before the limiters in the following equipment.

Martin Audio recommends that the AQX controller is always used with the limiters 'IN' and can accept no responsibility for loudspeaker or amplifier damage due to defeating the protection limiters.

The use of very high power amplifiers with outputs significantly greater than those recommended is discouraged.

Care should be taken to avoid switch on surges, which can result in momentary power peaks in excess of specified ratings. When powering up a sound system it is important to switch on the amplifiers after the mixer and control electronics have stabilised. When powering down the system, reverse the sequence and switch off the amplifiers first.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

14 AMPLIFICATION

AQ series loudspeakers are designed to be used with professional power amplifiers capable of producing the following power outputs into 4 ohms per channel. Power amplifiers with outputs exceeding those listed may be used by experienced users provided the amplifier is never allowed to clip. The cause of most loudspeaker voice coil burnouts can be attributed to under powered amplifiers being driven into clipping. Correct setting of the AQX limiters will ensure maximum system sound pressure levels, and maximum drive unit reliability.

AQ5 (4W) X 1	150-200W
AQ5 (16W) X 4	600-1000W
AQ6	100-400W
AQ8	100-400W
AQ10	400-650W
AQ12	400-650W
AQ112	400-1000W
AQ210	400-1000W
AQ212	800-2000W
AQ215	800-2000W

15 WARRANTY

The AQX controller is warranted to be free from defects in components and factory workmanship under normal use and service, for a period of one year from the date of original purchase. During the warranty period, MARTIN AUDIO LTD or its nominated agents, will undertake to repair or at its discretion, replace this product at no charge to its owner, when failing to perform as specified, provided the unit is returned undamaged, in its original packaging, shipping pre-paid, to the factory, distributor or authorised service facility.

This warranty shall be null and void, if the product is subjected to:

1. Repair work or alteration by persons other than those authorised by MARTIN AUDIO LTD or its agents.
2. Shipping accidents, act of God, war, civil insurrection, misuse, abuse operation with incorrect AC voltage, operation with faulty associated equipment, exposure to inclement weather conditions and normal wear and tear. Units, on which the serial number has been removed or defaced, will not be eligible for warranty service
3. MARTIN AUDIO LTD shall not be responsible for any incidental or consequential damages, with respect to the products warranted.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

MARTIN AUDIO LTD reserve the right to make changes or improvements in design or manufacturing, without assuming any obligation to change or improve products previously manufactured.

This warranty is exclusive and no other warranty is expressed or implied.

This warranty does not affect your statutory rights.

International Customers

Please contact your supplier for this information, as rights and disclaimers may vary from country to country.

Technical assistance and services

International

If your Martin Audio product needs repair, contact your Martin Audio dealer or distributor, or contact Martin Audio by fax or email to obtain the location of the nearest dealer or distributor.

Telephone: + 44 (0) 1494 535312

Fax: + 44 (0) 1494 438669

E-mail: info@martin-audio.com

www.martin-audio.com

All material © 2007. Martin Audio Ltd. Subject to change without notice.

16 AQX TECHNICAL SPECIFICATIONS

INPUTS	2 Electronically Balanced
Impedance	20K ohms (10K ohms per leg single ended)
CMRR	60dB 20Hz – 10KHz
Connectors	3 Pin female XLR
OUTPUTS	4 Electronically Balanced
Source Impedance	62 ohms
Min Load Impedance	600 ohms
Max Output	+20dBu into 600 ohms
Connectors	3 Pin Male XLR
Frequency Response	-3dB's@ 18 Hz 12dB's /octave -3dB's@ 45KHz 12dB's /octave (ultimately set by system parameters)
Distortion + noise	0.01% THD @ 2V output (limiters cancelled)
Signal + Noise/ Noise Ratio	>100dB's @ 2V output
Limiters	Individual for each channel Ratio 20:1.Threshold range –12dBu to +12dBu In 16 steps
Mains Supply	Captive 2m 3 core cable with integral U.K. 3 pin plug
Mains Voltage	Internally selectable by hard wire link* 100-120/ 220-240VAC, 50/60 Hz.Voltage tolerance on each setting ± 10%
Mains Fuse	100-120V and 220-240V: - 160mA Type 'T' (L)
Dimensions	(W) 483mm x (H) 44mm x (D) 155mm (W) 19ins x (H) 1.75ins x (D) 6.1ins
Shipping Dimensions	(W) 545mm x (H) 120mm x (D) 235mm (W) 21.5ins x (H) 4.7ins x (D) 9.3ins
Weight	2.4Kg (5.3lbs)
Shipping Weight	2.9Kg (6.4lbs)

* NO ATTEMPT SHOULD BE MADE BY THE USER TO CHANGE THE MAINS OPERATING VOLTAGE FROM THAT SUPPLIED, REFER TO QUALIFIED PERSONNEL ONLY.

All material © 2007. Martin Audio Ltd. Subject to change without notice.

AQX Controller

MARTIN AUDIO
LONDON

The Martin Experience

Century Point, Halifax Road, Cressex Business Park, High Wycombe, Buckinghamshire HP12 3SL, England.
Telephone: +44 (0)1494 535312 Facsimile: +44 (0)1494 438669
Web: www.martin-audio.com E-mail: info@martin-audio.com

All material © 2007. Martin Audio Ltd. Subject to change without notice.